

## THE CLAIMS

What is claimed is:

1. A golf ball comprising:

5 a core;

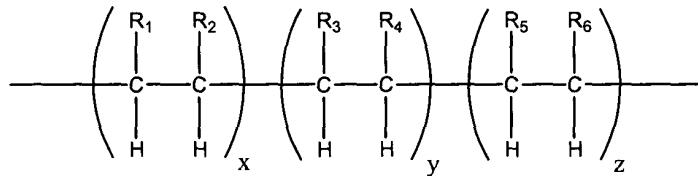
an intermediate layer formed from a polymer blend comprising a first material having a flexural modulus of between about 65,000 psi and about 120,000 psi and a second material comprising a grafted-metallocene polymer; and

10 a cover layer comprising a castable reactive liquid material.

15 2. The golf ball of claim 1, wherein the first material comprises thermoplastic or thermoset polyurethanes, thermoplastic or thermoset polyetheresters or polyetheramides, thermoplastic or thermoset polyester, a dynamically vulcanized elastomer, a functionalized styrene-butadiene elastomer, a metallocene catalyzed polymer or blends thereof.

20 3. The golf ball of claim 1, wherein the grafted metallocene polymer is formed from homopolymers and copolymers of ethylene; and a second olefin comprising propylene, butene, pentene, hexene, heptene, octene, and norbornene.

4. The golf ball of claim 1, wherein the grafted metallocene polymer has the formula:



wherein:

25 R<sub>1</sub> is hydrogen, branched or straight chain alkyl such as methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, and octyl, carbocyclic, aromatic or heterocyclic;

R<sub>2</sub> is hydrogen, lower alkyl including C<sub>1</sub>-C<sub>5</sub>; carbocyclic, aromatic or heterocyclic

R<sub>3</sub> is hydrogen, lower alkyl including C<sub>1</sub>-C<sub>5</sub>, carbocyclic, aromatic or heterocyclic;

5           R<sub>4</sub> is selected from the group consisting of H, C<sub>n</sub>H<sub>2n+1</sub>, where n = 1 to 18, and phenyl, in which from 0 to 5 H within R<sub>4</sub> can be replaced by substituents selected from the group consisting of COOH, SO<sub>3</sub>H, NH<sub>2</sub>, F, Cl, Br, I, OH, SH, silicone, lower alkyl esters and lower alkyl ethers, with the proviso that R<sub>3</sub> and R<sub>4</sub> can be combined to form a bicyclic ring;

10           R<sub>5</sub> is hydrogen, lower alkyl including C<sub>1</sub>-C<sub>5</sub>, carbocyclic, aromatic or heterocyclic;

15           R<sub>6</sub> is hydrogen, lower alkyl including C<sub>1</sub>-C<sub>5</sub>, carbocyclic, aromatic or heterocyclic; and

20           wherein x ranges from 1-99 percent, y ranges from 99-1 percent, and z ranges from 0 to 49 percent.

5.           The golf ball of claim 1, wherein the castable reactive liquid material comprises thermoset or thermoplastic polyurethanes, polyureas, urethane ionomers, urethane epoxies, or a mixture thereof.

15           6.           The golf ball of claim 1, wherein the grafted metallocene polymer is functionalized by sulfonation, carboxylation, the addition of an amine or hydroxy group, or a mixture thereof.

20           7.           The golf ball of claim 1, wherein the grafted metallocene polymer is a maleic anhydride grafted metallocene polymer.

25           8.           The golf ball of claim 1, wherein the grafted-metallocene polymer is foamed or unfoamed.

9.           The golf ball of claim 1, wherein the polymer blend further comprises a non-ionomer.

30           10.          The golf ball of claim 1, wherein the intermediate layer has an outer diameter of between about 1.58 and about 1.64 inches.

11. The golf ball of claim 1, wherein the outer cover has a Shore D hardness of between about 30 and about 60.

5 12. The golf ball of claim 1, wherein the intermediate layer has a Shore D hardness of about 65 to about 80.

13. The golf ball of claim 1, wherein the intermediate layer has a thickness of no greater than about 0.055 inches.

10 14. The golf ball of claim 1, wherein the outer cover layer has a thickness of less than about 0.05 inches.

15. A golf ball comprising:

a core;

an intermediate layer formed of a polymer blend comprising an ionomer having at least about 16% acid groups and a non-ionomer;

20 a layer comprising a foamed or unfoamed metallocene-catalyzed polymer or polymer blend, the layer being disposed between the core and the intermediate layer or between the intermediate layer and the cover layer; and

a cover layer formed from a castable reactive liquid material comprising thermoset polyurea.

16. A golf ball comprising:

a core;

25 an intermediate layer formed of a polymer blend comprising a material having a flexural modulus of between about 65,000 psi and about 120,000 psi and a non-ionomer;

a layer comprising a foamed or unfoamed metallocene-catalyzed polymer or polymer blend; and

30 a cover layer comprising a castable, thermoset polyurethane or polyurea;

wherein the layer is disposed between the core and the intermediate layer or between the intermediate layer and the cover layer.